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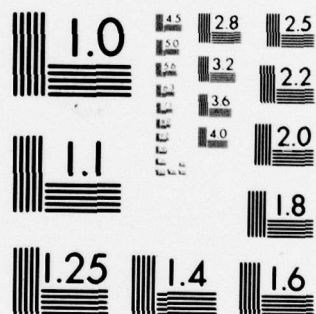
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by

R.B. Harvey and Clare Murray

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SUFFIELD TECHNICAL NOTE NO. 471

INFLATION AND THE REFERENCE LIBRARY (U)

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ABSTRACT

The DRES library approached the problem of increasing costs of subscriptions and increasing specialization by undertaking a study which *sought* looked at the following questions:

- (a) to identify the sources of information that the scientists found most useful to their work; and
- (b) to define a group or listing of journals that form an essential "core" to the research program, and to compare the proposed list of journals with the present DRES list of subscriptions.

A series of interviews with the scientific staff at DRES was ~~used in the~~ *conducted* study. The questionnaire designed for the interviews contained specific questions and requests for opinions, as well as providing the chance for each scientist to recommend the journals valuable to him in his work.

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ABSTRACT (Cont'd)

Results of the survey indicated a heavy reliance on the open literature, i.e., the scientific and technical publications, a slight preference for manual literature searches over computerized searches, the value of conversation and meetings as an information source, and some of the information needs which lead scientists to search the open literature. A list of journals recommended by the scientists was compiled from the interviews. A number of conclusions were drawn from the results of the survey, bearing in mind that the survey method is "user limited" and survey results will reflect the individual's interests and preferences.

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ACKNOWLEDGEMENT

We would like to extend our thanks and appreciation to all staff at DRES who participated in the interviews; and a special thanks to the members of the Library Committee for all their time, co-operation and help throughout the various phases of the study.

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RALSTON ALBERTA

SUFFIELD TECHNICAL NOTE NO. 471

INFLATION AND THE REFERENCE LIBRARY (U)

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R.B. Harvey and Clare Murray

INTRODUCTION

The rapidly rising cost of maintaining the subscriptions to scientific and technical publications in a reference library is a major factor in the budget of most libraries. Increased costs due to inflation have been compounded by an adverse shift in the exchange rates since most of the journals are imported from other countries. The semi-annual report to the faculties committee of one university expresses the problem, "inflation and the declining dollar have caused the library's periodical budget to drop 30 per cent in real terms" (Appendix A). Another factor in the rising cost of maintaining a reference library is the number of new journals arising from the increasing specialization in fields of knowledge.

The problem was approached in two ways at DRES:

- (a) The Chief/DRES appointed a Library Committee of a Chairman and five members from the scientific disciplines represented in the research program. The committee was directed to "recommend on an annual basis to which publications and

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services the establishment should subscribe, and to recommend a system for determining the usefulness of individual publications and library services to the establishment".

- (b) The library undertook a study with the help of a summer research assistant to carry out a survey of the scientific staff using the reference journals, and to compile a listing of those journals of greatest use in their work.

This report is a description of the survey and of some of the results from it.

THE COST OF INFORMATION

The immediate problem of the costs of library subscriptions leads to two more basic questions:

- (a) What is the cost of information? and
- (b) If a reference library is selected as a means to supply information, what is the "utility" of the subscriptions purchased?

Most research workers do extensive searches and reviews of the scientific literature pertaining to their subject in order to take advantage of the latest and best knowledge in their field, and to build on it in pursuit of their problem. Hence, they ask "Does information exist on this problem?" and "If it exists, is it accessible?". The problem of existence has been approached historically through a search of the printed indexes and abstracts by manual means, and more recently by machine assisted searches of a wide variety of data bases. If it is determined that information exists, and specific references are obtained, they are usually examined by recourse to the referenced journals themselves, by requests for copies, or through loan of the pertinent volumes.

If no reference to information is located by the scientist, it may be less expensive to regenerate it through his own research or, if that is not feasible and the facts and data are important, to conduct a much broader and more intensive search.

The DRES reference library subscribes to more than three hundred scientific publications, including several of the most frequently used indexes and abstracts. These enable searches to be carried out by manual means, while a computer terminal is available to give access to the National Research Council (NRC) CAN/OLE system*, so that searches can also be carried out by machine-assisted means. No study has been done to date to compare the relative cost and the completeness of the search by each system.

Most of the references required are available in the DRES library and those which are not can be obtained through interlibrary loan or by purchase of copies of the article required. The relative costs of obtaining a referenced article by interlibrary loan, by purchase of a copy, or by subscription to the journal in which the article is printed, have not been determined, although it would form one basis of a decision in respect of the number and kinds of journals that should be held.

The two questions of existence and accessibility have been the subject of a good deal of work. One view on the likely direction of "information transfer" is expressed in an editorial by Cummings (Appendix B). The first of the two problems (to search what has been published) may be best approached by computerized on-line bibliographic retrieval. The second problem of retrieving the actual book or article depends not so much on computerized methods or independent libraries as on the sharing of resources among libraries. Science librarians rely more and more on cooperation to provide for the needs of their users. The problem is discussed by Palmour, Bellassai and Wiederkehr (1). These authors conclude that at low levels of use of a journal, borrowing is the less costly alternative, while at high levels of use owning is the less costly alternative. At an intermediate level of use, called the crossover point, owning and borrowing are equally costly. Cost data from three research libraries are presented.

* A computerized system for searching a wide range of data bases. It is operated by the Canada Institute for Scientific and Technical Information (CISTI).

The ideas above led to a definition of the DRES problem in two phases:

- (a) to identify the sources of information that the scientists found most useful to their work; and
- (b) to define a group or listing of journals that form an essential "core" to the research program, and to compare the proposed list of journals with the present DRES list of subscriptions.

METHOD

A method of interviews with the scientific staff who use the library to support their work was used to obtain data in answer to the questions above. The interviews were moderately structured since a number of specific questions were included to obtain information for comparison and for statistical purposes. A number of observations or opinions were requested throughout the interview to broaden the response and to obtain individual viewpoints. An information form was designed including definitions of many of the terms used and the questions to be discussed. The form covered three areas:

- (a) a worker beginning a new field,
- (b) a worker in a field familiar to him; and
- (c) the relative importance of groups of journals, as well as the particular journals that each found useful.

This information form was distributed to the staff a day before the interviews to allow them to consider the questions.

A response form to match the questionnaire was designed for the interviewer, so that the answer to specific questions could be recorded more easily in order to maintain consistency throughout the interviews. With the permission of those being interviewed, notes were made on subjects where opinions or general observations had been requested.

It was found that four interviews was the maximum number that

could be accommodated in one day, if notes were to be made on additional information arising from the interview. In a few cases it was necessary to return for additional explanation or expansion of ambiguous points. A copy of the questionnaire is attached as Appendix C, and of the response sheet as Appendix D.

The survey included scientists representing a variety of disciplines, and a range of years of education. The Defence Sciences Division (DSD) includes chemistry, biomedicine and microbiology and by virtue of the disciplines, it is primarily concerned with a research oriented program of work directed more at adding to the "scientific reservoir" from which the applications of technology are drawn. The Defence Technologies Division (DTD) includes engineering, electronics and computer sciences, and its program, including research, is pointed more toward the application of science to a specific problem, and to tasks relating to the design of methods and systems for the test and evaluation of military hardware.

A third group of staff members for whom the reference library fills a lesser role is composed of those that provide the support to the research programs, but have no independent projects of their own. These include, of course, the library itself, meteorology, photography, and others who require journals in their discipline in order to be familiar with current work, but who do not use the library as a resource in direct support of their work.

Twenty-six staff members were interviewed in DSD of whom fourteen have a Ph.D. Twenty-eight staff members were interviewed in DTD of whom six have a Ph.D. Five staff members from the third group were also interviewed, making a total of fifty-nine interviews. Some of the staff members have been working in their field for more than ten years and have accumulated experience over more than twenty years. Others have recently joined DRES staff and they are relative "beginners" in their field of work.

RESULTS OF THE SURVEY

The data from the interviews, including responses to specific

questions as well as viewpoints from discussions, were assembled and are discussed below in two groupings. One grouping is made up of the responses from the DSD staff, and the other grouping from the responses of the DTD staff. The actual selection of journals for a listing of subscriptions is discussed after the responses to the questionnaire have been considered. Definitions of sources of information and other explanations relevant to the questions are given on the questionnaire form detailed in Appendix C, and the discussion below follows the general order of the questionnaire. Where data are grouped from two or more questions of the questionnaire the sources are indicated by question number e.g., A.1, B.2, etc.

1. Ratings of the usefulness of the information sources (A.1, A.2, B.1)

Table I

Sources of Information for Research Workers

| <u>Source</u> | <u>Beginner</u> | <u>Experienced</u> | <u>All</u> |
|-----------------|-----------------|--------------------|-----------------|
| Open Literature | 49 | 22 | 71 (40%) |
| Texts | 42 | 4 | 46 (25%) |
| Reports | 7 | 10 | 17 (9%) |
| Meetings | 10 | 11 | 21 (12%) |
| Visits, etc. | <u>19</u> | <u>7</u> | <u>26</u> (14%) |
| | 127 | 54 | 181 |

- (a) Both DSD and DTD staff strongly support the use of the open literature and of texts - 65% of the total number of responses. Textbooks and the open literature serve as an introduction before taking part in meetings, visits, conversations and discussions.
- (b) With experience in the field there is less reliance on texts and more on meetings and reports, as indicated by the percentage of responses recommending the usefulness of texts for

the beginner and the usefulness of reports for the more experienced worker.

Table II

Information Sources - Textbooks vs Reports and Meetings

| <u>Source</u> | <u>Beginner</u> | <u>Experienced</u> |
|----------------------|-----------------|--------------------|
| Texts | 33% | 8% |
| Reports and Meetings | 13% | 39% |

- (c) DTD feels visits and conversations are helpful to the man entering a new field (A.1, A.2).

Table III

Information Sources for a New Field

| <u>Source</u> | <u>DSD</u> | <u>DTD</u> |
|-----------------|----------------|-----------------|
| Open Literature | 30 (53%) | 19 (28%) |
| Texts | 20 (35%) | 22 (32%) |
| Reports | 2 (3%) | 5 (7%) |
| Meetings | 2 (3%) | 8 (12%) |
| Visits, etc. | <u>4</u> (6%) | <u>15</u> (21%) |
| | 58 | 69 |

- (d) Although the open literature and texts account for more than 50% of the responses for both DSD and DTD, the responses in favour of meetings and visits are approximately 30% for DTD but only 9% for DSD. Many people from DTD feel meetings, etc. are the best way to stay current in the field. One suggestion from DTD is: "If working with a group, then

the other members of the group are the quickest way to become acquainted with the field."

2. Literature Searches - Printed Indexes Versus Computer Data Bases (A.3)

Table IV

Literature Searches - Manual vs Computer Aided

| | <u>DSD</u> | <u>DTD</u> | <u>A11</u> |
|-------------------|------------|------------|-----------------|
| Printed Indexes | 22 | 17 | 39 (44%) |
| Computer Searches | 15 | 17 | 32 (35%) |
| Other | <u>8</u> | <u>11</u> | <u>19</u> (21%) |
| | 45 | 45 | 90 |

- (e) The idea of a literature search in answer to questions is strongly supported. In the replies to the questionnaire, DTD shows a slight preference for the search of computerized data bases, while DSD prefers the printed indexes.

The completeness and thoroughness of the printed indexes are the major advantages over a computerized search of the open literature. Further advantages are the ease of getting to the references in printed form, and the grouping of subject areas which provides easy reference to related topics. Since humans are more flexible than machines, in a manual search you have the advantage of finding "by chance" keywords you had not considered before going to the abstracts or indexes.

Speed and convenience are the major advantages of a computer search, also presentation of recent and relevant data in the form you want it. Detailed and specialized procedures must be followed for a computerized search to be successful, since inexperience in using it leads to incomplete results.

A combination of the two methods, a search of the printed

indexes and a computer search, appears to provide the most satisfactory method for reviewing the literature. The computer search gives a broad coverage of the available literature by finding the obvious references and supplying a mass of information quickly; from here it is possible to do slower, more intensive searches in the printed indexes using the references and bibliographies of the articles provided by the computer search. Although this is the general opinion, some people consider the computer search more useful for answering specific questions. Finally, one person uses a computer search, manual search and Current Contents*, each with its advantages and disadvantages, and each providing slightly different information:

- (1) printed indexes provide a hard copy, with bibliographic details and abstracts; however, they are likely to be out of date;
- (2) Current Contents is up-to-date but incomplete; and
- (3) a computer search is a good way to obtain information quickly but usually it does not cover a sufficient time span.

The computer can search as easily on authors, corporate source, or other bibliographic heading as it can on subjects. The printed indexes cannot do this.

As it is now, the computer search can be somewhat of an illusion if no references turn up, i.e., you can be led to believe there are no references, when in fact you know some are available. Experiences such as this leave feelings of apprehension and mistrust in the computer, although the lack of references is often caused by a lack of knowledge of computer language which may lead to the use of the wrong keywords or combinations. There will always be a risk of missing references; however, this is also possible in a manual search so you may as well use the faster method: the computer search. Most people realize the potential benefits of a computer

* A weekly publication of the Institute for Scientific Information, which provides the titles of papers and other relevant material from journals in the respective subject areas (e.g., Life Sciences, Engineering).

search and, with the necessary advances and refinements, and with individual training or trained personnel for searching, the manual search can be replaced by a computerized search. Those who have a good knowledge and understanding of computers and computer searches regard this as the only way to carry out a literature search and review.

A staff member working in the medical field had one of the most interesting suggestions about literature searches and the library itself. Contract literature searches are seen as an answer to the DRES library problem as they could eliminate the necessity of maintaining a reference library. Hiring university students by contract appeared to be a fast and efficient way to find and retrieve information. In this case, the problem or question was explained to, and discussed with, a university contact who then assigned students to carry out the search of the literature. References were copied and returned to the research worker. One feature is the variety of search methods available to the student (or professional searcher) and the professional advice available both in the field being searched and with respect to methods for search.

3. Use of the other Information Sources (Meetings, Conversations, Discussions) to Obtain References to Published Literature (A.5)

These information sources are helpful in the early stages of a project as indicated by 85% - 90% of those interviewed; usefulness will diminish later (75% - 80%).

For the beginner, meetings, conversations and discussions are a useful source of information to obtain references to published literature, given that he has done some introductory reading. Those who think these do not continue to be important information sources feel this is because you should know the most useful references after 3 - 6 months. In addition, your research project and the best sources of information may be better defined. Meetings, etc. especially, are not useful after 3 - 6 months if you become highly specialized and hence the only one in your field. The general conclusion is: meetings, conversations and discussions are useful during the initial stages of work and do remain a useful source of information after 3 - 6 months in the field but to a lesser degree.

4. Do you use the Literature to Answer Specific Questions or for General Reading? (B.6)

Table V

Use of Scientific Periodicals

| | <u>DSD</u> | <u>DTD</u> |
|--------------------|-----------------|-----------------|
| Specific Questions | 24 (63%) | 16 (43%) |
| General Reading | <u>14</u> (37%) | <u>21</u> (57%) |
| | 38 | 37 |

- (f) It is interesting that DSD uses the scientific periodicals as a source of information for specific questions, while DTD uses them more for general reading. Nonetheless, the kind of information obtained appears to be similar in DSD and DTD (See Table VI).

5. What are the Important Types of Information You Find in the Literature? (B.2)

Table VI

Information Found in the Literature

| | <u>DSD</u> | <u>DTD</u> | <u>All</u> |
|--------------------------|------------|------------|-----------------|
| Experimental Techniques | 24 | 23 | 47 (36%) |
| General Theory | 12 | 13 | 25 (18%) |
| State-of-the-art Reviews | 23 | 18 | 41 (31%) |
| Other | <u>10</u> | <u>10</u> | <u>20</u> (15%) |
| | 69 | 64 | 133 |

The prominence of the state-of-the-art reviews and experimental techniques, 67% of the total number of responses, indicates a very program-oriented use of the literature. This is consistent with the answer to another question, i.e., with the view that core and peripheral journals are important, general interest journals less so.

These results suggest that the difference in use of the literature by DSD and DTD is program related: DSD is oriented more to the technology base (research), while DTD is oriented to technology application. Conversations with DTD reveal the importance of using the open literature to learn about new commercial products, trends in the field and the availability of products and services. The scientific literature, as well as industrial publications, application notes and commercial catalogues, provides a significant source for techniques and state-of-the-art reviews for DTD. Sources of information other than the open literature, for both DSD and DTD, include personal contacts, classified literature and reports from other establishments.

6. Does DRES Hold the Review Articles and Reference Texts that You Need? (B.4)

The replies are almost unanimous that DRES holds the review articles and reference texts needed, and unanimous that DRES should maintain this resource. The few cases where DRES does not hold these items are due to the nature of the individual's work and the fact that relevant reference texts and review articles are not available.

7. Can the Open Literature be Supplanted or Replaced by Other Information Sources (Texts, Reports, Meetings, Visits)? (B.5)

No: 94% Yes: 6%

This is an indication of the heavy reliance on the library of open literature publications and ties in with question 1, on the usefulness of open literature and texts as information sources.

The other information sources are complementary to the journals

and periodicals, they provide different kinds of information. In particular, textbooks are out of date; conversations, visits, etc. are useful; and although random publications might seem the only possible prospect for replacing the open literature, DRES could never afford to have a collection of reports comprehensive enough to substitute for the open literature.

Greater use of interlibrary loan is a suggestion for possible replacement of DRES' subscriptions, however retention of the abstracts is essential. Although there is some overlap between information sources if anything were removed, you would always be losing something. One final comment in answer to this question, "removal of the open literature would mean removal of the research".

8. Summary of Sections A and B of the Questionnaire

The open literature, supplemented by text books, is strongly supported as an information source for both the newcomer and the experienced worker in any field. The use of printed indexes and computerized data bases is necessary to find reference material. Conversation, meetings and discussions may help. DSD uses the literature for specific questions; DTD more for general reading. Experimental techniques and reviews account for two thirds of the use of the literature. DRES holds most of the literature references. Other information sources are no substitute for use of the open literature.

The following are suggested from the results of the survey:

- (a) Continuation of subscription to the printed indexes with encouragement in the use of computer searches of suitable data bases.
- (b) Courses on computerized information retrieval for those not familiar with it.
- (c) Continuation of a reference library as the basis for support of the research program with a regular review of the listings to ensure that the journals received adequately represent the subject areas in current use.

THE REFERENCE JOURNALS

Sections A and B of the questionnaire for the survey are concerned with the questions of the existence of information and how to retrieve it. Section C is concerned with the compilation of a listing of journals and periodicals that would form the basis of the reference library at DRES. Journals were separated into three groups according to their use:

- (1) Core journals - those consulted regularly in the conduct of the research;
- (2) Peripheral journals - those journals whose coverage is broad enough to contain articles relevant to the work; and
- (3) General Interest journals - journals not confined to any one field or discipline, and not necessarily related to the research projects.

A series of questions was listed asking about the value of the classes of journals, and the uses to which they are put. In addition, it was requested that each person interviewed suggest a list of journals in each class, to a maximum of ten, which he felt the DRES library should have. See the questionnaire, Section C (Appendix C).

The lists of journals suggested by DSD and DTD are sufficiently different that they can be grouped and discussed separately. For example, in DSD the disciplinary periodicals (chemistry, physics, etc.) tend to be predominant, in which appreciable time lags occur between completion of the research and appearance in published form. DTD requires very up-to-date information on state-of-the-art equipment or developments (including sources such as trade magazines and catalogues), while the journals devoted to theory are used more for background. DTD can employ good ideas gleaned from any source and developed for application to the work of the division, leading to a rather more diversified group of journals.

All users were not expected to agree on the journals to form a collection, but the accumulated journal list contained a substantial fraction of "single choices", that is, journal titles which were submitted by only

one person. Fifty-five to sixty-five percent of the core journals were selected by two or more people, but the "single choice" selections were predominant in the case of peripheral and general interest journals, being 76% in both cases. The numbers of journals selected by one person (single choices) and by more than one person for DSD and for DTD are shown in the tables below.

Table VII

Journals Selected by DSD

| DSD | Selected by | | Total |
|---------------|---------------|----------|-------|
| | More than One | One Only | |
| Core | 75 | 60 | 135 |
| Peripheral | 4 | 24 | 28 |
| Gen. Interest | 6 | 17 | 23 |
| Total | 85 | 101 | 186 |

Table VIII

Journals Selected by DTD

| DTD | Selected by | | Total |
|---------------|---------------|----------|-------|
| | More than One | One Only | |
| Core | 61 | 30 | 91 |
| Peripheral | 6 | 8 | 14 |
| Gen. Interest | 3 | 13 | 16 |
| Total | 70 | 51 | 121 |

About two thirds of all the journals selected by DSD were classed as "core" and, of these, some 44 percent were the result of single choices. Of the remaining third (Peripheral plus General Interest) some 80 percent of the selections were the result of single choices (Table VII). In DTD, three quarters of the selected journals were classed as "core" and, of the remaining quarter (Peripheral plus General Interest), 70 percent of the selections were the result of single choices (Table VIII). The cost of providing those subscriptions to journals for which there is only a single request represents a fraction of the journal budget which is more difficult to defend in a period of financial shortage.

A total of 307 journals was selected by the two divisions, including some duplications. Removal of duplicate subscriptions reduced the number of selections to 285, of which 218 were core, 37 peripheral and 30 general interest. Nearly 47% (133/285) were the result of a "one only" choice.

The list of single choice journals was reviewed by the Library Committee and separated into two groups: one group which was related to, or provided information support to, the research program, and a second group which was considered to be of general interest. In a period of budgetary restriction, the second group would be the more difficult to defend.

The table below presents the results of the weeding. The table covers the combined total of the journals for DSD and for DTD and separates them into groups of:

- those selected by two or more persons;
- those marked by the Library Committee for retention; and
- those for possible deletion in the case of budget restrictions.

The Committee recommended retention of 84% (112/133) of the "single choice" journals.

Table IX

Combined Totals of Journals for DSD and DTD Including
Single Choice Journals for Retention and Deletion

| | Selected by more than one | Marked by Library Committee for | | Total |
|---------------|---------------------------------|------------------------------------|----------|-----------|
| | | Retention | Deletion | |
| Core | 137 | 73 | 8 | 218 (77%) |
| Peripheral | 80 | 26 | 3 | 37 (13%) |
| Gen. Interest | 7 | 13 | 10 | 30 (10%) |
| Total | 152 | 112 | 21 | 285 |

In a period of restraint in which some journal subscriptions must be sacrificed, it would appear that the "popular" journals should be deleted first, since they are available at libraries and bookstores and they are rarely used for retrospective searches. The second group to be deleted is the single or "one only" choices since they represent the interest of a single person and, if that person were no longer involved with the research program, the purchase of a subscription would not be supported.

COMMENTS FROM THE LIBRARY COMMITTEE

During the course of the study, the Library Committee made a number of comments and suggestions.

1. Journals such as Popular Science (which was recommended for subscription) are available in the Public Library or on the shelves of magazine stores, and they are cheap enough that personal subscriptions are possible. However, because of the low cost of these journals, deleting them from the DRES subscription list would mean minimal savings.
2. Publications in the open literature may be obtained through

the use of interlibrary loans as an alternative to a subscription to the journal in which the article appears. A comparison of the costs of the two methods is desirable.

3. One approach to a measure of the "utility" of a journal might be to record the number of articles that are copied by Xerox over a given period such as a year.
4. If unsure about retaining the subscription to some journals attach a label to the front of those journals and ask the user to mark it when 'read'. These marks will assist in determining the value of the journal.

COMPARISON OF COMPILED LISTING WITH PRESENT SUBSCRIPTIONS

The result of the work is a listing of journals based on the recommendations of the user population. A number of the journals (7%) have been marked by the Library Committee as candidates for deletion if severe budgetary restrictions were to occur. The listing is presented in Appendix C (with candidates for deletion marked).

If the titles of the list are compared with those to which the DRES Library currently subscribes, it is found that:

- 181 titles are presently received by the DRES library;
- 104 titles are not presently received; and
- 121 journals now received do not appear in the list.

DISCUSSION

This work was undertaken as part of a study of ways to provide information support to the R and D program at minimum cost. It looks particularly at the reference library of scientific periodicals. A survey was made of the scientific staff using the library to determine what information is required. All staff members were included in the survey. The survey is "user limited", that is, at best it will answer the question "What information sources are best suited to this group of users?" from the point of view, "What sources do they themselves prefer?"

One requirement of a survey method is that it ask the right question. Three areas were probed:

- information sources for the worker beginning a new field;
- information sources for a worker familiar with the field; and
- the reference library as an information source - what publications should be available in it.

Another factor is the interpretation of the information which is obtained by the survey, since it can be coloured by personal opinions and viewpoints of the user, of the person conducting the survey, and of the person interpreting the results.

Because of its comparative isolation from other scientific libraries, DRES has built up a reference library to make itself largely self-sufficient. The true reference library tries to be comprehensive and to provide literature covering a long time span. Changes in the research program frequently result in poor support for new fields, at least initially. Shifts from a basic research approach to one of development or of test and evaluation make it essential that information be current state-of-the-art, up-to-date and able to cope with a comparatively rapid turnover. The present day response to the new, rapidly moving subject areas is peer referral and group exchange of information at meetings and conferences or by visits. It is difficult for the reference library to acquire the literature already published for a new field and, if the program suffers a change of subject area, it will probably be forced to curtail journals in subject areas which have been abandoned in order to contain the growth of subscription lists. Such changes in subject area lead quickly to the conclusion that search and retrieval will move to computerized scanning of numerous data bases, and to interlibrary loan of the references themselves from a few resource centres to fill the requirements for the full text of the references themselves.

These ideas are consistent with the information obtained by the survey. The reference library as an information source was supported by substantially all the staff surveyed, i.e., those in both DSD and DTD, although the usefulness of group discussion and peer referral was noted by

the latter group. The importance of printed abstracts and indexes for search (by manual methods) was emphasized, although it was apparent that computerized methods would supersede those resorting to hard copy as a result of rising prices, changes in subject areas, and particularly with improved search services and data bases.

The subject of microforms, microfiche and microfilm, as a means to reduce subscription prices or as a possibility to obtain past issues of a publication found no great favour, although they would exist as a possibility in case of need. Journals printed in a foreign language tend to be consulted less because of a problem of translation, and occupy a less prominent place in a compiled list.

According to some users, one shortcoming of the DRES library is the ineffectiveness of computer search. This seems to stem from a failure to discover references on a search subject which are suspected or known to exist. Success depends on the use of the appropriate keywords or descriptors and on accuracy in their use, factors which admit some tolerance if a manual search of printed indexes is carried out. It would appear to be desirable to make available to all staff a course in the use of machine methods in search and retrieval, and to encourage them actively to enroll in it and use the system. Coupled with a system of Selective Dissemination of Information, it is felt that this would provide a reasonably complete coverage of the literature.

The users were invited (as a part of the survey) to offer a list of journals to be subscribed to by the library. The results have been discussed above. There will be a shortcoming in the library as subject matter changes and a greater dependance will be put on interlibrary loans, copying and other methods to obtain the full text of references.

It was hoped initially to estimate the utility of a journal. Several methods were proposed but no real answer was obtained because of the short time available for the study. One method is to estimate for each publication the number of useful articles divided by the total number of articles for a one year period. Other methods are to count the number of

times the journal is borrowed over a year, or to count the number of citations occurring for any one journal in literature searches.

No attempt was made to estimate costs in this study, either for literature searches or for acquiring copies of the references. Clearly this should be the next step followed by an evaluation of other sources or methods of acquiring information.

It may be interesting to compare the list of journals the users recommended (which was compiled by the study) with the list ordered for the library. Some variation may occur in the counts of journals retained, deleted and added since a few subscriptions have renewal dates during the year, some journals are subdivided into sections: A, B, C, etc. perhaps not all of which are ordered, and so on.

The recommendations of the survey of the user population, with respect to the 329 journals to which DRES subscribed in 1978, were as follows:

- to retain 222 subscriptions,
- to cancel 107 subscriptions, and
- to add 84 new subscriptions.

This would reduce the total number of subscriptions from 329 (222 plus 107) for 1978 to 306 (222 plus 84) for 1979. However, the users were given "a last look" at the list of subscriptions before the order was submitted to the agency, with the result that 305 journals were to be retained out of the list of 329 (for 1978), 28 were to be cancelled instead of 107, and 63 new titles were to be added instead of 84. The number of subscriptions, then, increased from 329 in 1978 to 368 in 1979.

CONCLUSIONS

Some of the principal conclusions resulting from this study are:

- (a) The conventional reference library has a strong appeal to the scientific staff as a means of providing information support to the research program.

- (b) The worker beginning a new field is recommended to study reference texts and review the literature. When he has an understanding of the field he may benefit by attending meetings and conferences.
- (c) A user survey resulted in a list of some 300 journal titles recommended to be held by the DRES library. The titles were split among 218 core, 47 peripheral and 30 general interest periodicals.
- (d) The use of printed indexes for manual subject search was strongly emphasized, but the changeover to, and progressive use of, computerized search of data bases is recognized as a way to cope with the problems of changing subject areas in research, short term development and equipment evaluation projects.
- (e) One worker recommended the use of university contracts (students) for literature searches and reviews as a means to improve the information service and reduce the necessity of a full reference library.
- (f) Interpretation of survey material from the user population should consider a tendency to reflect particular scientific interests of the individuals and personal preferences in information sources.

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Hard times hit bookshelves at U of C library

By BOB HERGEN

Economic hard times have dealt a severe blow to the University of Calgary's library.

In a semi-annual report to the general faculties committee, past and present members of the library committee said inflation and the declining dollar have caused the library's periodical budget to drop 20 per cent in real terms.

It means the library will receive nearly 20 per cent fewer new books this year.

The committee was also told that the dilemma which faces the library faces the university as a whole.

According to Dr. William Converse, acting chief librarian, drastic measures had to be taken this summer to make sure the acquisition of science periodicals operated in the black.

At the request of the former chief librarian \$225,000 was made available to the library to bail it out of its financial trouble around the end of June.

According to the university's academic vice-president, that was a short-term solution to a problem that has yet to be solved.

"The big problem, while we were able to find \$225,000 under our normal operating procedures, it's only for this year and not the next," Dr. Peter Kruger told the committee.

"There is no way of knowing if it will be able to incorporate funds in additional amounts to compensate for the effects of inflation and, God forbid, a further decline in the Canadian dollar," he said.

The additional funds were ap-

plied to the book and periodical budget because, explained Dr. Converse, it was scientific and medical journals that were hardest hit. Costs in those areas increased in the order of 30 per cent last year, and at least 80 per cent of the science acquisitions were in the form of periodicals.

"As the invoices come in, many come from hard currency European countries," Dr. Converse said.

"I ordered one-fifth less books in the last fiscal year."

According to Dr. Converse some 5,000 books a month are added to the library.

He said the crunch has forced a major revision of the periodical subscriptions.

"My fear is that if the financing of the library is approached from a different angle we might cut into the core things that are vitally necessary for major research," Dr. Converse said.

The other fear, he said, is that there might be pressure to relocate money from other areas to keep sciences afloat.

While the report appeared before the committee only yesterday, the financial problems facing the library have been known since Sept. 1 last year.

"The university is well aware of the problem and the library has been given very generous treatment," Dr. Converse said.

"It is a complicated problem involving inflation and currency fluctuations and the university has no control over it," he said.

"It is a university problem. The library isn't being given the short end of the stick. They are in a box too."

"Some very, very tough decisions will have to be made."

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Information Transfer: The Biomedical Model

"Knowledge is of two kinds. We know a subject ourselves, or we know where we can find information upon it." In 1775, when Samuel Johnson wrote these words, there existed men of science who could claim to possess knowledge in their disciplines that was both broad and deep. Today, even with the fractionation of science, it would be a presumptuous scientist who claimed to know everything in his specialty. What is true for scientists is true also for librarians: to paraphrase the great doctor: scientific literature is of two kinds—we have the information ourselves, or we know where to borrow it.

The problem of information transfer in contemporary science is exacerbated by two trends. First is the geometric increase in published knowledge in all branches of science and technology. Second, as inexorable as the first but more pernicious, is the rapidly rising cost of books and journals. Many libraries are not able to keep pace. The net result of both trends has been a decrease in the proportion of the total scientific record held by each library.

Steps to cope with this dilemma are already being taken by libraries and information centers. The solution is a long-term one and has two elements: improving our ability to search the aggregate record of what has been published and identify pertinent materials, and improving our ability to then retrieve the books and journal articles themselves.

For the first of these two elements the key is computerized on-line bibliographic retrieval. In the area of biomedicine it has been demonstrated that a large and growing body of literature, both periodical and monographic, can be indexed, entered into a central computer, and searched economically in real time from computer terminals in more than 900 institutions across the United States. The experience gained from operating this system—called MEDLINE—should have wide application in other scientific fields.

Today's health professional has an array of bibliographic data bases available for instantaneous searching over the MEDLINE network: journal articles, monographs, audiovisual materials, toxicology and environmental health data, chemical information, health planning and management literature, cancer research information, and so forth. The number of references and abstracts in these combined data bases is now approaching 4 million. More than 1 million on-line searches are being performed each year.

The second element—retrieving the actual book or article—depends not so much on computers (although they have their place) as on sharing resources. As the increasing volume of scientific literature strains the capacity of shelves and budgets, science librarians rely more and more on cooperation to provide for the needs of their users. In many instances local and regional consortia have been formed. Union catalogs and lists of periodicals allow an information center of modest size to provide access to what would be an extensive collection if it were housed in one institution.

In this area also, the health sciences have assumed a leading role. A network of biomedical libraries, ranging from local community hospitals to 11 regional medical libraries to the National Library of Medicine, ensures that a document, no matter where it is located, is available to any other member of the network. Within the network, more consortia of health science libraries are being encouraged. Members of consortia not only share their books and journals but arrange cooperative on-line search services and training—activities that individually they are too small to engage in but that collectively they find feasible.

The information services pioneered by biomedical libraries may provide a useful pattern for improving communication in other fields of science. There are problems yet to be overcome, but experience indicates that the basic approach of computerized bibliographic access with concomitant library resource sharing is sound.—MARTIN M. CUMMINGS, *National Library of Medicine, National Institutes of Health, Bethesda, Maryland 20014*

APPENDIX C

SURVEY QUESTIONNAIRE

APPENDIX C

SURVEY QUESTIONNAIRE

SOURCES OF INFORMATION

1. Open Literature - journals and periodicals using manual and computer searches.

Open literature is used to obtain more detailed information than is available in a textbook. The information would be expected to represent the latest views and theories on the subject.

2. Textbooks and Reference Texts

Textbooks give a broad, general coverage of a subject or a field. For example, The Effects of Nuclear Weapons is a reference text on the effects of a nuclear explosion on particular targets.

3. Miscellaneous Random Publications, Report Papers

These may be detailed treatments of a subject which is of particular interest to some group or laboratory but not suitable for open publication. They are often indexed by government departments. Much relevant information may be available from the reports in fields which are active and of interest, e.g., conservation, energy and oil supplies.

4. Meetings

Meetings usually present the most recent work on a topic, and one can find out easily what institutions are active in a field, and who the recognized workers are.

5. Conversations, Visits and Discussions

Following on from meetings, one can contact the speakers and go into more detail on particular aspects that are of interest. This may result in visits to labs to see work in progress. This is one way to get a real knowledge of a field, but it may not be productive until a broad, general knowledge is gained - sufficient to discuss the field.

A. When you approach a new subject area in your field

1. How would you rate the information sources 1 - 5?
2. What is the quickest way for the beginner to get acquainted with the field, and the current problem areas of interest?
3. If he does a literature search and review, what is likely to be the best method?
 - a) printed indexes and abstracts? Which ones?
 - b) Current Contents?
 - c) Computer search? Which Databases?
 - d) Any other way?

Why do you consider this to be the best method?

4. Following a search, as in 3 above, what percentage of the references will be found in
 - a) The DRES journals?
 - b) Interlibrary loans?
 - c) Copies, ordered by computer (CAN/OLE)?
 - d) Other?
5. If a beginner in the field starts work on a project, is he likely to benefit from suggestions, about literature references, in meetings, conversations or discussions?

Will this continue to be a useful source of information after he has worked in the field for a time - say 3 to 6 months?

B. After working in the field for a time and having a good general knowledge of it

1. How would you rate the information sources 1 - 5?
2. What are the important things you find in the open literature?
 - a) techniques?
 - b) general theory?
 - c) state-of-the-art reviews?
 - d) other?

To what other sources do you go for those things not found in the open literature?

3. How many literature searches would you do in a year?
4. In your field, are there reference texts or review articles that are particularly valuable? Please name them if possible.
 - i) Does the DRES library have them?
 - ii) Should DRES obtain them?
5. With a view to saving on subscriptions, can the literature search on periodicals be replaced by information sources 2 - 5? To some degree or at all?
6. Do you go to the literature for specific questions, or is it more useful for general reading?

C. Open Literature - journals and periodicals

Due to the increasing specialization of research fields and of the journals, we would view journals as falling into 2 groups:

- a) narrow coverage - they are quite useful, or they are of little value
- b) broad coverage - something for everybody, but no great detail or depth

With this in mind, make the following classifications -

Core Journals - journals consulted regularly in the conduct of your research

- journals directly applicable to the problem or problem field

For example, for the electronic or instrumentation engineer:

Electronics, Electronic Design

Peripheral Journals - any journals, other than core journals, whose coverage is broad enough that they may contain articles of interest

- those journals in allied fields

For example, publications in physics, chemical engineering or maybe medicine for the chemist

General Interest Journals - journals not confined to one field or discipline

For example, American Scientist, Scientific American, Review of Scientific Instruments

1. Which journals do you find the most valuable, up to 10?
2. Should the DRES library have a subscription to these journals?
3. Please mark those journals (from 1) you would consider to be highly specialized, and those that are broad enough that they would contain articles of interest to all those in your section?
4. What peripheral journals would you recommend that the DRES library should have?
5. Are peripheral journals useful for browsing?
6. Do you pick up any ideas from general interest journals?
7. Do you feel that general journals and maybe nonscientific subscriptions should be retained?
8. What general interest publications, whether journals, books or other materials, do you recommend should be in the DRES library, up to 10?

APPENDIX D

QUESTIONNAIRE RESPONSE SHEET

APPENDIX D

QUESTIONNAIRE RESPONSE SHEET

- A. 1.
2. 1 2 3 4 5
3. a) _____
b) _____
c) _____
d) _____
- Why? _____
4. a) _____ b) _____ c) _____ d) _____
5. meetings _____ conversations _____ discussions _____
Yes _____ No _____
- B. 1.
2. a) _____ b) _____ c) _____ d) _____
Other sources: _____
- 3.
4. Yes _____ No _____
List: 1.
2.
3.
4.
5.
i) Yes _____ No _____
ii) Yes _____ No _____
5. Yes _____ No _____
degree _____
How? _____

6. Specific questions _____ General reading _____

C. 1 and 3. 1.

2.

3.

4.

5.

6.

7.

8.

9.

10.

2. Yes _____ No _____

4. 1.

2.

3.

4.

5.

5. Yes _____ No _____

6. Yes _____ No _____

7. Yes _____ No _____

8. 1.

2.

3.

4.

5.

6.

7.

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9.

10.

APPENDIX E

RECOMMENDED LIST OF JOURNALS AND PERIODICALS

APPENDIX E

RECOMMENDED LIST OF JOURNALS AND PERIODICALS

* - indicates those single-selection journals
marked by the Library Committee as candidates for deletion

A.I.A.A. Journal (American Institute of Aeronautics and Astronautics)
A.I.Ch.E. Journal (American Institute of Chemical Engineers)
Acoustical Society of America. Journal
Acta Astronautica
Acta Chemica Scandinavica
Acta Pathologica et Microbiologica Scandinavica
Acta Pharmacologica et Toxicologica
Air Pollution Control Association. Journal
American Chemical Society. Journal
American Cinematographer
American Journal of Epidemiology
American Journal of Physiology
American Journal of Veterinary Research
American Medical Association. Journal
American Meteorological Society. Journal
American Scientist
American Society of Agricultural Engineers. Transactions of the A.S.A.E.
American Society of Mechanical Engineers. Transactions.
Journal of Fluids Engineering
American Society of Mechanical Engineers. Transactions.
Journal of Heat Transfer
American Veterinary Medical Association. Journal
Anaesthesia and Analgesia

Anesthesiology
Analyst
Analytical Abstracts
Analytical Biochemistry
Analytical Chemistry
Angewandte Chemie
Annalen der Chemie, Justus Liebig's
Annual Review of Fluid Mechanics
Annual Review of Pharmacology
Applied and Environmental Microbiology
Applied Mechanics Reviews
Archives Internationales de Pharmacodynamie et de Therapie
Archives of Neurology*
Archives of Virology
Armies and Weapons
Association for Computing Machinery. Communications of the A.C.M.
Astronautics and Aeronautics
Audio Engineering Society*
Audioscene Canada
Automotive Engineering
Automotive Industries
Aviation Week and Space Technology
Bacteriological Reviews
Biochemical and Biophysical Research Communications
Biochemical Journal

Biochemical Pharmacology
Biochemistry
Biochimica et Biophysica Acta
Biomedical Technology Information Service
Bio-organic Chemistry
Bits and Pieces*
Brain Information Service
Brain Research
British Journal of Anaesthesia
British Journal of Pharmacology
British Journal of Venereal Diseases
British Medical Journal
Byte
CRC Critical Reviews in Toxicology
Canadian Aeronautics and Space Journal*
Canadian Controls and Instrumentation
Canadian Defence Quarterly
Canadian Electronic Engineering
Canadian Geotechnical Journal
Canadian Journal of Biochemistry
Canadian Journal of Chemical Engineering
Canadian Journal of Chemistry
Canadian Journal of Comparative Medicine and Veterinary Science
Canadian Journal of Microbiology
Canadian Journal of Physiology and Pharmacology

Canadian Journal of Public Health
Canadian Medical Association. Journal
Canadian Office
Canadian Police Chief*
Canadian Research
Cellular Immunology
Chemical Abstracts
Chemical and Engineering News
Chemical Communications
Chemical Engineering
Chemical Engineering Science
Chemical Reviews
Chemical Society, London. -
 Dalton Transactions
 Perkin Transactions I
 Perkin Transactions II
Chemische Berichte
Chemistry and Industry
Chemtech
Clinical Chemistry
Clinical Pharmacology and Therapeutics
Combustion, Explosion and Shock Waves
Computer Magazine
Computer Data
Computers and Fluids
Computers and Structures
Computing Canada
Computing Surveys
Contamination Control

Control Engineering

Current Chemical Papers

Current Contents. Life Sciences

D.A.T.A. Books* -

D.A.T.A. Book of Discontinued Thyristors

D.A.T.A. Book of Discontinued Transistors

Linear Integrated Circuit D.A.T.A. Book

Thyristor D.A.T.A. Book

Transistor D.A.T.A. Book

Data Management

Datamation

Dyestuff Reporter*

EDN

EDP Guide

EDP In-Depth Reports

Electrical Engineer's Regulation Handbook

Electro Optical Systems Design

Electroencephalography and Clinical Neurophysiology. The EEG Journal*

Electronic Design

Electronic Engineering

Electronics

Electronics and Communications Abstracts

Electronics and Medical Instrumentation Abstracts

Electronics Today

Elementary Electronics, Including Science and Electronics

Engineer's Regulation Handbook*

Engineering News-Record*

Epilepsia

European Journal of Biochemistry

European Journal of Clinical Pharmacology
European Journal of Pharmacology
Excerpta Medica. Section 4
Excerpta Medica. Section 30
Experientia
Experimental Mechanics
Federation Proceedings (Federation of American Societies for
Experimental Biology)
Food and Cosmetics Toxicology
Forces Journals (US, UK)
General Safety Digest
Geophysics
Geotechnique
Guide on EDP Administration
Hansard
Harvard Business Review*
Heat Transfer and Fluid Flow Digest
Helvetica Chimica Acta
I.E.E. Proceedings
I.E.E.E. Proceedings
I.E.E.E. Spectrum
I.E.E.E. Transactions on Acoustics, Speech and Signal Processing
I.E.E.E. Transactions on Aerospace and Electronic Systems
I.E.E.E. Transactions on Antennae and Wave Propagation
I.E.E.E. Transactions on Automatic Control
I.E.E.E. Transactions on Bio-Medical Engineering
I.E.E.E. Transactions on Computers

I.E.E.E. Transactions on Instrumentation and Measurement
I.E.E.E. Transactions on Magnetics
I.E.E.E. Transactions on P.A.M.I.
I.E.E.E. Transactions on Software Engineering
I.E.E.E. Transactions on Vehicular Technology
Industrial and Engineering Chemistry
Industrial Photography
Industrial Research/Development
Infection and Immunity
Instrumentation Technology
Instruments and Control Systems
Intech*
Interface Age
International Defence Review
International Journal for Numerical Methods in Engineering
International Journal of Mass Spectroscopy and Ion Physics
International Journal of Nondestructive Testing
International Perspectives
International Photo Technik
Interavia*
Journal of Aerosol Science
Journal of Analytical Chemistry
Journal of Applied Mechanics
Journal of Applied Physics
Journal of Applied Physiology

Journal of Bacteriology
Journal of Biological Chemistry
Journal of Chemical Education
Journal of Chemical Physics
Journal of Chromatographic Science
Journal of Chromatography
Journal of Clinical Microbiology
Journal of Cyclic Nucleotide Research
Journal of Environmental Sciences
Journal of Fluid Mechanics
Journal of General Chemistry of the USSR
Journal of General Microbiology
Journal of Immunological Methods
Journal of Immunology
Journal of Infectious Diseases
Journal of Laboratory and Clinical Medicine
Journal of Magnetic Resonance
Journal of Mechanical Engineering Science
Journal of Medicinal Chemistry
Journal of Meteorology
Journal of Molecular Biology
Journal of NMR Spectroscopy
Journal of Nervous and Mental Diseases*
Journal of Neurochemistry
Journal of Neuroscience Research

Journal of Neurosurgery*
Journal of Non-Newtonian Fluid Mechanics
Journal of Organic Chemistry
Journal of Pharmacology and Experimental Therapeutics
Journal of Pharmacy and Pharmacology
Journal of Physical Chemistry
Journal of Physics. E. Scientific Instruments
Journal of Physiology
Journal of Rheology
Journal of Sound and Vibration
Journal of Terramechanics
Journal of the Atmospheric Sciences
Journal of Trauma
Journal of Virology
Lancet
Law and Order*
Life Sciences
Machine Design
Machinery Handbook*
Maritime Defence International
Mechanical Design
Mechanical Engineering
Mechanics Illustrated
Metric Monitor*
Microbiological Reviews

Military Journals
Military Manuals (especially Military Engineering)
Military Medicine
Nature
Naturwissenschaften
Naunyn Schmiedeberg's Archives of Pharmacology
Navy International
Neuropharmacology
New England Journal of Medicine
New Scientist
Newspapers*
Nuclear Physics
Office Equipment and Methods
Organic Magnetic Resonance
Organic Mass Spectroscopy
Organic Syntheses
Pharmacological Reviews
Photomethods
Physical Reviews
Physics Abstracts
Physics in Technology
Physics of Fluids
Physics Today
Physiological Reviews
Popular Electronics

Popular Mechanics
Popular Science
Propellants and Explosives*
Psychopharmacologia
Psychopharmacology
Quarterly Journal of the Royal Meteorological Society
R/C Modeller
R/D. Research and Development
Radio Electronics
Review of Scientific Instruments
Reviews of Modern Physics
Royal Society of London. Proceedings. Series A
Royal United Services Institute for Defence Studies. Journal
Scandinavian Journal of Infectious Diseases
Science
Science Dimension
Science Forum
Scientific American
Sea Technology
Sentinel
Shock and Vibration Digest
Society of Motion Picture and T.V. Engineers. Journal
Software Practice and Experience
STAR (Scientific and Technical Aerospace Reports)
Synthesis
Test

Tetrahedron

Tetrahedron Letters

Tissue Culture Association Manual

Toxicology and Applied Pharmacology

U.S. Naval Institute Proceedings

Veterinary Medicine/Small Animal Clinician

Virology

Virology Monographs

World Health Organization Bulletin

Scientific staff who prefer the use of printed indexes and abstracts for reference work and for literature searches have recommended the list of publications given below. Those publications which are marked with a double asterisk (**) also appear in the general list above.

Abstracts from various Symposia

Acoustical Society of America. Journal**

American Society of Agricultural Engineers. Transactions**

Applied Mechanics Reviews**

Biological Abstracts

Chemical Abstracts**

Document Digest (DSIS)

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Journal of Chromatography**
Journal of Physics E. Scientific Instruments**
NTIS Tech Notes
Nuclear Science Abstracts
Patents Indexes
Review of Scientific Instruments**
Science Abstracts
Science Citation Index (SCI)
Scientific and Technical Aerospace Reports (STAR)**

The following is an additional list of journals, recommended by two new staff members in the Preventive Medicine Section (DSD). These scientists came to DRES while the study was in progress.

Archives of Microbiology
Biochimica et Biophysica Acta (four sections)
 Bioenergetics
 Enzymology
 Lipids and Lipid Metabolism
 Nucleic Acids and Protein Synthesis
Cell
European Journal of Immunology
FEBS Letters (Federation of European Biochemical Societies)
FEMS Letters (Federation of European Microbiological Societies)
Immunological Reviews
Immunology

Journal of Immunological Methods

Scandinavian Journal of Immunology

Additional Comments and Suggestions About the Journals

1. When the single-selection lists were circulated for recommendation, two journals were added:
Journal of Computational Physics
Computational Fluid Dynamics.
2. The Systems Section would like to see subscriptions to as many of the I.E.E.E. Transactions as possible. In particular, they asked that none of the present subscriptions be removed.
3. A request was made for subscriptions to journals about microwaves and radar, e.g., Microwaves, Micro System News, Microwave Journal.
4. Many people in DTD consider 'popular' science and electronics journals valuable for their advertising, in addition to their use as a source of information and ideas.

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| 13. ABSTRACT The DRES library approached the problem of increasing costs of subscriptions and increasing specialization by undertaking a study which looked at the following questions: (a) to identify the sources of information that the scientists found most useful to their work; and (b) to define a group or listing of journals that form an essential "core" to the research program, and to compare the proposed list of journals with the present DRES list of subscriptions. A series of interviews with the scientific staff at DRES was used in the study. The questionnaire designed for the interviews contained specific questions and requests for opinions, as well as providing the chance for each scientist to recommend the journals valuable to him in his work. Results of the survey indicated a heavy reliance on the open literature, i.e., the scientific and technical publications, a slight preference for manual literature searches over computerized searches, the value of conversation and meetings as an information source, and some of the information needs which lead scientists to search the open literature. A list of journals recommended by the scientists was compiled from the interviews. A number of conclusions were drawn from the results of the survey, bearing in mind that the survey method is "user limited" and survey results will reflect the individual's interests and preferences. | | |

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